CLAIMS

I claim:

1. An automated method of shaping a thin side wall of a body without cutting, said method comprising the steps of:

predetermining a desired geometry of the thin side wall of the body in an electronic data model;

automated determining the actual geometry of the thin side wall of the body and storing it in an electronic data model;

calculating the difference between the desired geometry and the actual geometry of the thin side wall of the body;

determining local deformation zones in which the difference between the desired geometry and the actual geometry of the thin side wall of the body exceeds a defined predetermined limiting value;

calculating an energy profile to be locally applied in the local deformation zones by numerical methods;

applying defined pressure to one side of the thin side wall of the body; and

defined, automated increasing the deformability of the thin side wall of the body in the local deformation zones by a defined application of energy in the local deformation zones in accordance with the calculated local energy profile, the thin side wall of the body in the local deformation zones being deformed due to its increased deformability and the one-side application of pressure.

2. The method of claim 1, wherein the body is shaped without using a form.

3. The method of claim 1, wherein the defined pressure is applied to the one side of the thin side wall of the body by compressed air of defined pressure.

4. The method of claim 2, wherein the defined pressure is applied to the one side of the thin side wall of the body by compressed air of defined pressure.

5. The method of claim 1, wherein the defined pressure is applied to the one side of the thin side wall of the body by a hydraulic medium of defined pressure.

6. The method of claim 2, wherein the defined pressure is applied to the one side of the thin side wall of the body by a hydraulic medium of defined pressure.

7. The method of claim 1, wherein the actual geometry of the thin side wall of the body is continuously determined, and wherein the application of energy in the local deformation zones is controlled with respect to the continuously determined actual geometry of the thin side wall of the body.

8. The method of claim 2, wherein the actual geometry of the thin side wall of the body is continuously determined, and wherein the application of energy in the local deformation zones is controlled with respect to the continuously determined actual geometry of the thin side wall of the body.

9. The method of claim 3, wherein the actual geometry of the thin side wall of the body is continuously determined, and wherein the application of energy in the local deformation zones is controlled with respect to the continuously determined actual geometry of the thin side wall of the body.

10. The method of claim 4, wherein the actual geometry of the thin side wall of the body is continuously determined, and wherein the application of energy in the local deformation zones is controlled with respect to the continuously determined actual geometry of the thin side wall of the body.

11. The method of claim 1, wherein the energy profile to be locally applied in the local deformation zones is newly calculated for each step of deformation in the local deformation zones.

12. The method of claim 2, wherein the energy profile to be locally applied in the local deformation zones is newly calculated for each step of deformation in the local deformation zones.

13. The method of claim 3, wherein the energy profile to be locally applied in the local deformation zones is newly calculated for each step of deformation in the local deformation zones.

14. The method of claim 4, wherein the energy profile to be locally applied in the local deformation zones is newly calculated for each step of deformation in the local deformation zones.

15. The method of claim 1, wherein the thin side wall of the body has a thickness which is varied by purposefully choosing the respective local deformation zone.

16. The method of claim 1, wherein the defined application of energy in the local

deformation zones in accordance with the calculated local energy profile is realized by a laser beam.

17. The method of claim 16, wherein the deformability of the thin side wall of the body is varied by a variation of the term of usage of the laser beam.

18. The method of claim 16, wherein the deformability of the thin side wall of the body is varied by a variation of the intensity of the laser beam.

19. The method of claim 16, wherein the deformability of the thin side wall of the body is varied by a variation of the pulse width of the laser beam.

20. The method of claim 16, wherein the deformability of the thin side wall of the body is varied by a variation of the focus size of the laser beam.

21. The method of claim 1, further comprising the step of cooling the local deformation zones after the desired deformation of the thin side wall of the body has been reached.

22. An automated method of shaping a thin side wall of a body without cutting, said method comprising the steps of:

predetermining a desired geometry of the thin side wall of the body in an electronic data model;

automated determining the actual geometry of the thin side wall of the body and storing it in an electronic data model;

calculating the difference between the desired geometry and the actual geometry of the thin side wall of the body;

determining local deformation zones in which the difference between the desired geometry and the actual geometry of the thin side wall of the body exceeds a defined predetermined limiting value;

calculating an energy profile to be locally applied in the local deformation zones by numerical methods;

applying defined pressure to one side of the thin side wall of the body by compressed air; and

defined, automated increasing the deformability of the thin side wall of the body in the local deformation zones by a defined application of energy in the local deformation zones in accordance with the calculated local energy profile by a laser beam, the thin side wall of the body in the local deformation zones being deformed due to its increased deformability and the one-side application of pressure.

23. An apparatus for shaping a body having at least one thin side wall without cutting, comprising:

a unit being designed and arranged to automatedly determine and store the actual geometry of the thin side wall of the body in an electronic data model;

a computer being designed and arranged to predetermine a desired geometry of the thin side wall of the body in an electronic data model, to calculate the difference between the desired geometry and the actual geometry by a comparison of the determined actual geometry and the predetermined desired geometry of the thin side wall of the body, to determine local deformation zones in which the difference between the desired geometry and the actual geometry of the thin side wall of the body exceeds a defined predetermined limiting value and to calculate an energy profile to be locally applied in the local deformation zones;

a controllable pressure unit being designed and arranged to apply defined pressure to one side of the thin side wall of the body; and

a unit being designed and arranged to increase the deformability of the thin side wall of the body in the local deformation zones in a defined, automated way by a defined application of energy in the local deformation zones in accordance with the calculated local energy profile, the thin side wall of the body in the local deformation zones being deformed due to its increased deformability and the one-side application of pressure.

24. The apparatus of claim 23, wherein said controllable pressure unit is a compressed air unit and said unit being designed and arranged to increase the deformability of the thin side wall of the body is a laser.

25. The apparatus of claim 23, wherein said unit being designed and arranged to automatedly determine and store the actual geometry of the thin side wall of the body includes a 3-D object measuring system.

26. The apparatus of claim 24, wherein said unit being designed and arranged to automatedly determine and store the actual geometry of the thin side wall of the body includes a 3-D object measuring system.

27. An apparatus for shaping a body having at least one thin side wall without cutting, comprising:

a unit being designed and arranged to automatedly determine and store the actual geometry of the thin side wall of the body in an electronic data model;

a computer being designed and arranged to predetermine a desired geometry of the thin side wall of the body in an electronic data model, to calculate the difference between the desired geometry and the actual geometry by a comparison of the determined actual geometry and the predetermined desired geometry of the thin side wall of the body, to determine local

deformation zones in which the difference between the desired geometry and the actual geometry of the thin side wall of the body exceeds a defined predetermined limiting value and to calculate an energy profile to be locally applied in the local deformation zones;

a controllable compressed air unit being designed and arranged to apply defined pressure to one side of the thin side wall of the body; and

a laser being designed and arranged to increase the deformability of the thin side wall of the body in the local deformation zones in a defined, automated way by a defined application of energy in the local deformation zones in accordance with the calculated local energy profile by a laser beam, the thin side wall of the body in the local deformation zones being deformed due to its increased deformability and the one-side application of pressure.